

Intravenous fluid therapy in children and young people in hospital

Quality standard

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Contents

Quality statements	4
Quality statement 1: Measuring plasma electrolyte concentration and blood glucose.....	5
Quality statement.....	5
Rationale	5
Quality measures.....	5
What the quality statement means for different audiences.....	7
Source guidance.....	7
Definitions of terms used in this quality statement	8
Quality statement 2: Assessment of fluid balance.....	9
Quality statement.....	9
Rationale	9
Quality measures.....	9
What the quality statement means for different audiences.....	10
Source guidance.....	11
Quality statement 3: Fluid type for intravenous (IV) fluid resuscitation.....	12
Quality statement.....	12
Rationale	12
Quality measures.....	12
What the quality statement means for different audiences.....	13
Source guidance.....	14
Definitions of terms used in this quality statement	14
Quality statement 4: Fluid type for routine maintenance	15
Quality statement.....	15
Rationale	15
Quality measures.....	15
What the quality statement means for different audiences.....	16
Source guidance.....	17

Definitions of terms used in this quality statement	17
Quality statement 5: Intravenous (IV) fluids lead	18
Quality statement.....	18
Rationale	18
Quality measures.....	18
What the quality statement means for different audiences.....	19
Source guidance.....	19
Definitions of terms used in this quality statement	19
About this quality standard	21
Diversity, equality and language.....	21

This standard is based on NG29.

This standard should be read in conjunction with QS125, QS122, QS66, QS64, QS19, QS166 and QS193.

Quality statements

Statement 1 Term neonates, children and young people receiving intravenous (IV) fluid therapy have their plasma electrolyte concentrations and blood glucose measured when starting IV fluids and then at least every 24 hours.

Statement 2 Term neonates, children and young people receiving IV fluid therapy have their fluid balance assessed when starting IV fluids and then at least every 12 hours.

Statement 3 Term neonates, children and young people are not given hypotonic fluids or glucose-containing fluids for IV fluid resuscitation.

Statement 4 Term neonates, children and young people receiving IV fluids for routine maintenance are not given hypotonic fluids as the initial fluid.

Statement 5 Hospitals have an IV fluids lead who has overall responsibility for training, clinical governance, audit and review of IV fluid prescribing, and patient outcomes.

Quality statement 1: Measuring plasma electrolyte concentration and blood glucose

Quality statement

Term neonates, children and young people receiving intravenous (IV) fluid therapy have their plasma electrolyte concentrations and blood glucose measured when starting IV fluids and then at least every 24 hours.

Rationale

Continual assessment and monitoring of IV fluid, plasma electrolyte and blood glucose needs is important to ensure term neonates, children and young people maintain a correct fluid and electrolyte balance to reduce the risk of adverse events. As part of this, measuring and documenting patients' plasma electrolyte concentrations and blood glucose, initially and then every 24 hours, ensures that the correct type (that is, concentration of sodium and glucose) of IV fluid is prescribed. Documenting this, ideally on a standardised chart, helps healthcare professionals assess patients' fluid and electrolyte needs, prescribe and administer IV fluids, and monitor patient response. It is also helpful for healthcare professionals when patients are moved between or within hospitals.

Quality measures

The following measures can be used to assess the quality of care or service provision specified in the statement. They are examples of how the statement can be measured, and can be adapted and used flexibly.

Structure

Evidence of local arrangements to ensure that term neonates, children and young people receiving IV fluid therapy have their plasma electrolyte concentrations and blood glucose

measured when starting IV fluids and then at least every 24 hours.

Data source: Local data collection.

Process

a) Proportion of term neonates, children and young people starting IV fluid therapy who have their plasma electrolyte concentrations and blood glucose measured.

Numerator – the number in the denominator who have their plasma electrolyte concentrations and blood glucose measured.

Denominator – the number of term neonates, children and young people starting IV fluid therapy.

Data source: Local data collection.

b) Proportion of term neonates, children and young people receiving IV fluid therapy who have their plasma electrolyte concentrations and blood glucose measured every 24 hours or less from the start of IV fluids.

Numerator – the number in the denominator who have their plasma electrolyte concentrations and blood glucose measured every 24 hours or less from the start of IV fluids.

Denominator – the number of term neonates, children and young people receiving IV fluid therapy.

Data source: Local data collection.

Outcome

Patient safety incidents resulting from errors in IV fluid therapy in term neonates, children and young people.

Data source: Local data collection.

What the quality statement means for different audiences

Service providers (hospitals) ensure that systems are in place for term neonates, children and young people to have their plasma electrolyte concentrations and blood glucose status measured and documented when starting IV fluids and then at least every 24 hours.

Healthcare professionals (such as hospital doctors and nurse practitioners) ensure that they measure and document plasma electrolyte concentrations and blood glucose in term neonates, children and young people when starting IV fluids and then at least every 24 hours.

Commissioners ensure that they commission services in which term neonates, children and young people have their plasma electrolyte concentrations and blood glucose measured and documented when starting IV fluids and then at least every 24 hours. A standardised fluid balance chart should be agreed to help staff assess patients' plasma electrolyte and blood glucose status, prescribe and administer IV fluids, monitor patient response and help staff when patients move between hospitals and between hospital departments.

Term neonates (babies born at full term), children and young people have blood tests when they start IV fluid therapy to decide the type of IV fluid they need, and then again at least every 24 hours to ensure that they continue to receive the right type of IV fluid. The blood tests are to find out the levels of salt and sugar in the blood. All the information is recorded on a chart in their medical notes. Intravenous fluids (usually shortened to 'IV' fluids) are liquids given to replace water, sugar and salt that a person might need if they are ill or having an operation, and can't eat or drink as they would normally. IV fluids are given straight into a vein through a drip.

Source guidance

Intravenous fluid therapy in children and young people in hospital. NICE guideline NG29 (2015, updated 2020), recommendations 1.2.4 and 1.2.5

Definitions of terms used in this quality statement

Plasma electrolyte and blood glucose status

Both sodium and glucose should be measured as part of this assessment. This assessment should not routinely take place before elective surgery unless there is a need to do so, based on the child's medical condition or type of surgery. [[NICE's guideline on intravenous fluid therapy in children and young people in hospital](#), recommendations 1.2.4, 1.2.5 and 1.4.5]

Quality statement 2: Assessment of fluid balance

Quality statement

Term neonates, children and young people receiving intravenous (IV) fluid therapy have their fluid balance assessed when starting IV fluids and then at least every 12 hours.

Rationale

Continual assessment and monitoring of IV fluid, plasma electrolyte and blood glucose needs is important to ensure term neonates, children and young people maintain a correct fluid and electrolyte balance to reduce the risk of adverse events. As part of this, assessing and documenting patients' fluid balance, initially and then every 12 hours, ensures that the correct amount of IV fluid is prescribed. Documenting this, ideally on a standardised chart, helps healthcare professionals assess patients' fluid and electrolyte needs, prescribe and administer IV fluids, and monitor patient response. It is also helpful for healthcare professionals when patients are moved between or within hospitals.

Quality measures

The following measures can be used to assess the quality of care or service provision specified in the statement. They are examples of how the statement can be measured, and can be adapted and used flexibly.

Structure

Evidence of local arrangements to ensure that term neonates, children and young people receiving IV fluid therapy have their fluid balance assessed when starting IV fluids and then at least every 12 hours.

Data source: Local data collection.

Process

a) Proportion of term neonates, children and young people starting IV fluid therapy who have their fluid balance assessed.

Numerator – the number in the denominator who have their fluid balance assessed.

Denominator – the number of term neonates, children and young people starting IV fluid therapy.

Data source: Local data collection.

b) Proportion of term neonates, children and young people receiving IV fluid therapy who have their fluid balance assessed every 12 hours or less from starting IV fluids.

Numerator – the number in the denominator who have their fluid balance assessed every 12 hours or less from starting IV fluids.

Denominator – the number of term neonates, children and young people receiving IV fluid therapy.

Data source: Local data collection.

Outcome

Patient safety incidents resulting from errors in IV fluid therapy in term neonates, children and young people.

Data source: Local data collection.

What the quality statement means for different audiences

Service providers (hospitals) ensure that systems are in place for term neonates, children and young people to have their fluid balance assessed and documented when starting IV fluids and then at least every 12 hours.

Healthcare professionals (such as hospital doctors and nurse practitioners) ensure that term neonates, children and young people have their fluid balance assessed and documented when they start IV fluids and then at least every 12 hours.

Commissioners ensure that they commission services in which term neonates, children and young people have their fluid balance assessed and documented when starting IV fluids and then at least every 12 hours. A standardised fluid balance chart should be agreed to help staff assess patients' fluid needs, prescribe and administer IV fluids, monitor patient response and help staff when patients move between hospitals and between hospital departments.

Term neonates (babies born at full term), children and young people have their fluid levels checked when they start IV fluid therapy to decide the amount of IV fluid they need, and then at least every 12 hours to ensure that they continue to receive the right amount of IV fluid. All the information is recorded on a chart in their medical notes. Intravenous fluids (usually shortened to 'IV' fluids) are liquids given to replace water, sugar and salt that a person might need if they are ill or having an operation, and can't eat or drink as they would normally. IV fluids are given straight into a vein through a drip.

Source guidance

Intravenous fluid therapy in children and young people in hospital. NICE guideline NG29 (2015, updated 2020), recommendation 1.2.3

Quality statement 3: Fluid type for intravenous (IV) fluid resuscitation

Quality statement

Term neonates, children and young people are not given hypotonic fluids or glucose-containing fluids for intravenous (IV) fluid resuscitation.

Rationale

There are safety concerns about the use of hypotonic IV fluids in term neonates, children and young people. They have been associated with the development of hyponatraemia (decreased sodium levels in the blood), which can increase the risk of developing brain swelling and neurological complications as a consequence of hyponatraemia. To avoid these adverse consequences, hypotonic IV fluids should not be given for fluid resuscitation.

Term neonates, children and young people should receive glucose-free crystalloids for fluid resuscitation because they are the safest option.

Quality measures

The following measures can be used to assess the quality of care or service provision specified in the statement. They are examples of how the statement can be measured, and can be adapted and used flexibly.

Structure

Evidence of local arrangements to ensure that term neonates, children and young people are not given hypotonic fluids or glucose-containing fluids for IV fluid resuscitation.

Data source: Local data collection.

Process

Proportion of term neonates, children and young people who are given hypotonic fluids or glucose-containing fluids for IV fluid resuscitation.

Numerator – the number in the denominator who are given hypotonic fluids or glucose-containing fluids for IV fluid resuscitation.

Denominator – the number of term neonates, children and young people receiving IV fluid resuscitation.

Data source: Local data collection.

Outcome

Incidence of hyponatraemia attributable to IV fluid therapy in term neonates, children and young people.

Data source: Local data collection.

What the quality statement means for different audiences

Service providers (hospitals) ensure that protocols are in place so that term neonates, children and young people are not given hypotonic fluids or glucose-containing fluids for IV fluid resuscitation.

Healthcare professionals (such as hospital doctors and nurse practitioners) do not give hypotonic fluids or glucose-containing fluids to term neonates, children and young people for IV fluid resuscitation.

Commissioners ensure that they commission services that do not give hypotonic fluids or glucose-containing fluids to term neonates, children and young people for IV fluid resuscitation.

Term neonates (babies born at full term), children and young people receiving IV fluid therapy to replace lost fluids are not given a type of IV fluid called hypotonic fluid or fluids

containing glucose when they start IV fluid therapy. Intravenous fluids (usually shortened to 'IV' fluids) are liquids given to replace water, sugar and salt that a person might need if they are ill or having an operation, and can't eat or drink as they would normally. IV fluids are given straight into a vein through a drip.

Source guidance

[Intravenous fluid therapy in children and young people in hospital. NICE guideline NG29](#) (2015, updated 2020), recommendations 1.3.1 and 1.3.2

Definitions of terms used in this quality statement

Hypotonic fluids

A hypotonic fluid is a solution with a lower concentration of electrolytes than body plasma. An example of a hypotonic fluid is 0.45% sodium chloride. Although some solutions are isomolar in vitro, they are hypotonic in vivo (for example 0.45% sodium chloride with 2.5% glucose). See [NICE's guideline on intravenous fluid therapy in children and young people in hospital](#) for further examples of hypotonic and isotonic fluids.

Glucose-containing fluids

A glucose-containing fluid is either an isotonic or hypotonic fluid with glucose. [Adapted from [NICE's guideline on intravenous fluid therapy in children and young people in hospital](#)]

Fluid resuscitation

To rapidly expand blood volume, restore or maintain blood flow to the organs can be a lifesaving intervention. IV fluid resuscitation is commonly used in term neonates, children and young people undergoing major surgery, to treat sepsis, and after severe trauma. [Adapted from [NICE's guideline on intravenous fluid therapy in children and young people in hospital](#)]

Quality statement 4: Fluid type for routine maintenance

Quality statement

Term neonates, children and young people receiving intravenous (IV) fluids for routine maintenance are not given hypotonic fluids as the initial fluid.

Rationale

There are safety concerns about the use of hypotonic fluids in term neonates, children and young people. They have been associated with the development of hyponatraemia (decreased sodium levels in the blood), which can increase the risk of developing brain swelling and neurological complications as a consequence of hyponatraemia. To avoid these adverse consequences, hypotonic IV fluids should not be given as the initial fluid, because the sodium levels are not known.

Children and young people should receive isotonic crystalloids (with glucose for term neonates) because they are physiologically comparable to normal plasma, and therefore the safest option.

Quality measures

The following measures can be used to assess the quality of care or service provision specified in the statement. They are examples of how the statement can be measured, and can be adapted and used flexibly.

Structure

Evidence of local arrangements to ensure that term neonates, children and young people receiving IV fluids for routine maintenance are not given hypotonic fluids as the initial fluid.

Data source: Local data collection.

Process

Proportion of term neonates, children and young people receiving IV fluids for routine maintenance who are given hypotonic fluids as the initial fluid.

Numerator – the number in the denominator who are given hypotonic fluids as the initial fluid.

Denominator – the number of term neonates, children and young people receiving IV fluids for routine maintenance.

Data source: Local data collection.

Outcome

Incidence of hyponatraemia attributable to IV fluid therapy in term neonates, children and young people.

Data source: Local data collection.

What the quality statement means for different audiences

Service providers (hospitals) ensure that protocols are in place so that term neonates, children and young people receiving IV fluids for routine maintenance are not given hypotonic fluids as the initial fluid.

Healthcare professionals (such as hospital doctors and nurse practitioners) do not give hypotonic fluids as the initial fluid for term neonates, children and young people receiving IV fluids for routine maintenance.

Commissioners ensure that they commission services that do not give hypotonic fluids as the initial fluid to term neonates, children and young people receiving IV fluids for routine maintenance.

Term neonates (babies born at full term), children and young people receiving IV fluid therapy to maintain the level of fluid they need are not given a type of IV fluid called

hypotonic fluid when they start IV fluid therapy. Intravenous fluids (usually shortened to 'IV' fluids) are liquids given to replace water, sugar and salt that a person might need if they are ill or having an operation, and can't eat or drink as they would normally. IV fluids are given straight into a vein through a drip.

Source guidance

Intravenous fluid therapy in children and young people in hospital. NICE guideline NG29 (2015, updated 2020), recommendations 1.4.3 and 1.4.7

Definitions of terms used in this quality statement

Hypotonic fluids

A hypotonic fluid is a solution with a lower concentration of electrolytes than body plasma. An example of a hypotonic fluid is 0.45% sodium chloride. Although some solutions are isomolar in vitro, they are hypotonic in vivo (for example 0.45% sodium chloride with 2.5% glucose). See NICE's guideline on intravenous fluid therapy in children and young people in hospital for further examples of hypotonic and isotonic fluids.

Routine maintenance

To correct or maintain the fluid and electrolyte balance when term neonates, children and young people are not able to maintain their normal fluid needs by eating and drinking. [Adapted from NICE's guideline on intravenous fluid therapy in children and young people in hospital]

Quality statement 5: Intravenous (IV) fluids lead

Quality statement

Hospitals have an intravenous (IV) fluids lead who has overall responsibility for training, clinical governance, audit and review of IV fluid prescribing, and patient outcomes.

Rationale

The IV fluids lead in a hospital can promote best practice, ensuring that healthcare professionals are trained in prescribing and administering IV fluid therapy, and reviewing learning from incidents. This leadership role can ensure continuity of care in relation to fluid management through coordination between different hospital departments. Improved learning may reduce the number of future patient safety incidents.

Quality measures

The following measures can be used to assess the quality of care or service provision specified in the statement. They are examples of how the statement can be measured, and can be adapted and used flexibly.

Structure

Evidence that hospitals have an IV fluids lead who has overall responsibility for ensuring adequate training, clinical governance, audit and review of IV fluid prescribing, and patient outcomes.

Data source: Local data collection.

Outcome

Patient safety incidents resulting from errors in IV fluid therapy in term neonates, children and young people.

Data source: Local data collection.

What the quality statement means for different audiences

Service providers (hospitals) ensure that they have an IV fluids lead who has overall responsibility for ensuring adequate training, clinical governance, audit and review of IV fluid prescribing, and patient outcomes.

Healthcare professionals who care for term neonates, children and young people receiving IV fluid therapy in hospital work in the context of clinical governance arrangements that have an IV fluids lead who has overall responsibility for ensuring adequate training, clinical governance, audit and review of IV fluid prescribing, and patient outcomes.

Commissioners ensure that they commission services from hospitals that have an IV fluids lead who has overall responsibility for ensuring adequate training, clinical governance, audit and review of IV fluid prescribing, and patient outcomes.

Term neonates (babies born at full term), children and young people receiving IV fluid therapy are cared for in a hospital that has a person who has overall responsibility for ensuring that they receive safe and effective IV fluid therapy. Intravenous fluids (usually shortened to 'IV' fluids) are liquids given to replace water, sugar and salt that a person might need if they are ill or having an operation, and can't eat or drink as they would normally. IV fluids are given straight into a vein through a drip.

Source guidance

Intravenous fluid therapy in children and young people in hospital. NICE guideline NG29 (2015, updated 2020), recommendation 1.8.1

Definitions of terms used in this quality statement

Responsible IV fluids lead

The IV fluids lead will have overall responsibility, through a leadership role, for the quality

of care relating to IV fluid therapy. The IV fluids lead should be somebody in a senior position, and may delegate specific functions through normal governance structures. The IV fluids lead is not expected to be the person who delivers the training, clinical governance, audit and review of IV fluid prescribing, and patient outcomes. Those functions can be delegated to professionals who have the necessary specialist knowledge in the hospital. For hospitals that provide both adult and children's services, this may be a single role with support from healthcare professionals with expertise from both services. [Expert opinion]

About this quality standard

NICE quality standards describe high-priority areas for quality improvement in a defined care or service area. Each standard consists of a prioritised set of specific, concise and measurable statements. NICE quality standards draw on existing NICE or NICE-accredited guidance that provides an underpinning, comprehensive set of recommendations, and are designed to support the measurement of improvement.

Expected levels of achievement for quality measures are not specified. Quality standards are intended to drive up the quality of care, and so achievement levels of 100% should be aspired to (or 0% if the quality statement states that something should not be done). However, this may not always be appropriate in practice. Taking account of safety, shared decision-making, choice and professional judgement, desired levels of achievement should be defined locally.

Information about [how NICE quality standards are developed](#) is available from the NICE website.

See our [webpage on quality standards advisory committees](#) for details about our standing committees. Information about the topic experts invited to join the standing members is available from the [webpage for this quality standard](#).

NICE has produced a [quality standard service improvement template](#) to help providers make an initial assessment of their service compared with a selection of quality statements. This tool is updated monthly to include new quality standards.

NICE guidance and quality standards apply in England and Wales. Decisions on how they apply in Scotland and Northern Ireland are made by the Scottish government and Northern Ireland Executive. NICE quality standards may include references to organisations or people responsible for commissioning or providing care that may be relevant only to England.

Diversity, equality and language

Equality issues were considered during development and [equality assessments for this quality standard](#) are available. Any specific issues identified during development of the

quality statements are highlighted in each statement.

Good communication between healthcare professionals and term neonates, children and young people receiving intravenous (IV) fluid therapy, and their parents or carers (if appropriate), is essential. Treatment, care and support, and the information given about it, should be both age-appropriate and culturally appropriate. It should also be accessible to people with additional needs such as physical, sensory or learning disabilities, and to people who do not speak or read English. Term neonates, children and young people receiving IV fluid therapy, and their parents or carers (if appropriate), should have access to an interpreter or advocate if needed.

Commissioners and providers should aim to achieve the quality standard in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity and foster good relations. Nothing in this quality standard should be interpreted in a way that would be inconsistent with compliance with those duties.

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Endorsing organisation

This quality standard has been endorsed by NHS England, as required by the Health and Social Care Act (2012)

Supporting organisations

Many organisations share NICE's commitment to quality improvement using evidence-based guidance. The following supporting organisations have recognised the benefit of the quality standard in improving care for patients, carers, service users and members of the public. They have agreed to work with NICE to ensure that those commissioning or providing services are made aware of and encouraged to use the quality standard.

- [Association of Paediatric Anaesthetists of Great Britain and Ireland](#)
- [Royal College of Nursing \(RCN\)](#)
- [Royal College of Paediatrics and Child Health](#)